

CLAIMS

What is claimed is

1. A method for image sensing comprising the acts of:
producing, from a photo detector, a plurality of detected electronic signals responsive to an optical image;
amplifying, with a column buffer amplifier, signals selected from the detected electronic signals to produce a plurality of amplified signals;
sampling, with a correlated double sampler, signals selected from the amplified signals to produce a plurality of sampled signals;
and
clamping, by a clamp circuit, at least one signal selected from the detected electronic signals and the sampled signals in response to a detecting of at least one over-saturation condition;
whereby image inversion is at least partially abated.
2. The method of claim 1 wherein
the photo detector comprises a photo diode.
3. The method of claim 1 wherein
the photo detector comprises a photo gate.
4. The method of claim 1 wherein
the clamp circuit is implemented in a technology selected from a list consisting of N-well CMOS process technology and of P-well CMOS process technology.
5. A method for enhancing a video image comprising the acts of:
sampling a plurality of image signals with a correlated double sampler to produce a plurality of sampled signals;

4 clamping, with a clamp circuit, signals selected from the image signals and the
5 sampled signals during a reset phase of the correlated double sampler.

1 6. The method of claim 5 wherein
2 the clamp circuit limits a reset voltage.

1 7. The method of claim 5 wherein
2 the clamp circuit operates in conjunction with a column buffer amplifier
3 comprising a source follower.

1 8. The method of claim 5 wherein
2 the clamp circuit operates in conjunction with a column buffer amplifier
3 comprising a distributed pixel column amplifier.

1 9. The method of claim 8 wherein
2 the distributed pixel column amplifier provides to the column buffer amplifier a
3 feedback selected from a list consisting of a differential feedback and a single-ended
4 feedback.

1 10. A circuit comprising:
2 an image sensor array comprising:
3 a clamp circuit;
4 a column buffer amplifier;
5 and
6 a correlated double sampling circuit.

1 11. The circuit of claim 10 wherein
2 the image sensor array captures still images.

1 12. The circuit of claim 10 wherein
2 the image sensor array captures moving video images.

1 13. A method for processing a signal comprising:
2 producing a plurality of output luminance signals responsive to an incident light;
3 generating a first sample of one of the luminance signals at a first time and a
4 second sample of the respective luminance signal at a second time;
5 producing a threshold passed signal output responsive to a condition of over-
6 saturation by the incident light;
7 and
8 clamping the respective luminance signal sample during the first time responsive
9 to the threshold passed signal.

1 14. The method of claim 13 wherein
2 the plurality of output luminance signals are produced by sensors arranged as an
3 array of sensors having two dimensions.

1 15. The method of claim 14 further comprising the act of:
2 selecting a subset of luminance signals according to a dimensional direction in the
3 array.

1 16. A circuit for providing a signal comprising:
2 a plurality of pixel cells having a plurality of output luminance signals responsive
3 to an incident light;
4 a correlated double sampler operative to generate a first sample of one of the
5 luminance signals at a first time and a second sample of the respective luminance signal
6 sample at a second time;
7 a threshold detection circuit having a threshold passed signal output responsive to
8 a condition of one of the pixel cells of being over-saturated by the incident light;

9 and
10 a clamp circuit wherein the clamp circuit clamps the respective luminance signal
11 during the first time responsive to the threshold passed signal.

1 17. The circuit of claim 16 further comprising:
2 a plurality of per-column circuits that selects a subset of luminance signals.

1 18. The circuit of claim 17 wherein
2 the subset of luminance signals corresponds to a direction selected from a list
3 consisting of a column in an image to which the plurality of pixel cells is responsive and
4 a row in an image to which the plurality of pixel cells is responsive.

1 19. The circuit of claim 18 wherein
2 the plurality of per-column circuits has a greater cardinality than the subset of
3 luminance signals.

1 20. A circuit for providing a signal comprising:
2 a means for producing a plurality of output luminance signals responsive to an
3 incident light;
4 a means for generating a first sample of one of the luminance signals at a first
5 time and a second sample of the respective luminance signal at a second time;
6 a means for producing an over-saturation signal output responsive to a condition
7 of over-saturation by the incident light;
8 and
9 a means for clamping the respective luminance signal sample during the first time
10 responsive to the over-saturation signal.

1 21. The circuit of claim 20 further comprising:
2 a means for selecting a subset of luminance signals.

1 22. The circuit of claim 21 wherein
2 the subset of luminance signals corresponds to a column in an image to which the
3 circuit for providing a signal is responsive.

1 23. The circuit of claim 21 wherein
2 the subset of luminance signals corresponds to a row in an image to which the
3 circuit for providing a signal is responsive.

1 24. In an image sensor that correlates a first sample of a first signal during a first
2 interval after reset of a photo detector and a second sample of the first signal during a later
3 interval to produce a luminance signal, a method for abating an error in the luminance signal due
4 to excessively rapid slewing of the first signal during the first interval wherein the improvement
5 comprises:

6 detecting that the first signal is slewing excessively rapidly during the first
7 interval; and

8 limiting the value of the first sample;

9 whereby the image sensor produces an output of improved accuracy.

1 25. The method of claim 24 wherein:
2 the error is an image inversion due to over-saturation.

1 26. The method of claim 24 wherein:
2 the detecting is responsive to the first signal reaching the bounds of a
3 predetermined threshold.